CLAIMS

What is claimed is:

1.   An automated method for assessing a measured object in relation to its assembly environment, comprising:

collecting measurement data for a measured object;

defining model data representative of an assembly environment for the measured object, where the assembly environment is defined by surfaces of objects that are adjacent to the measured object in an assembled configuration; and

comparing the measurement data with the model data for the assembly environment, thereby assessing the measured object in relation to the assembly environment.

2.   The method of Claim 1 wherein the step of collecting measurement data further comprises capturing image data indicative of the measured object using a non-contact sensor, the image data being defined in relation to a first reference frame.

3.   The method of Claim 1 further comprises aligning the measurement data for the measured object with model data representative of an assembly environment prior to comparing the measurement data with the model data.

4.   The method of Claim 3 wherein the step of aligning further comprises translating the measurement data from the first reference frame to a second reference frame associated with the model data for the assembly environment.

5.   The method of Claim 1 further comprises defining one or more inspection points along a periphery of the measured object and comparing the measurement data with the model data at each of the inspection points.

6.   The method of Claim 1 wherein the step of comparing the measurement data with the model data further comprises computing at least one of a gap measure and a flushness measure between the measured object and an adjacent surface of the assembly environment.

7.   An automated method for assessing fit and alignment of an assembly component in relation to its assembly environment, comprising:

collecting measurement data for the assembly component, the measurement data being defined in relation to a first reference frame;

defining model data representative of an assembly environment, where the assembly environment is defined by surfaces of objects that are adjacent to the assembly component in an assembled configuration;

aligning the measurement data with model data representative of an assembly environment for the assembly component; and

comparing the measurement data with the model data for the assembly environment, thereby assessing fit and alignment of the assembly component in relation to the assembly environment.

8. A quality assessment system for assessing an assembly component in relation to its assembly environment, comprising:

a non-contact sensor mounted to a movable member of a robot, the non-contact sensor operable to collect measurement data representative of the surface of the assembly component;

a data structure for storing model data representative of an assembly environment, where the assembly environment is defined by surfaces of objects that are adjacent to the assembly component in an assembled configuration; and

an assessment application adapted to receive the measurement data for the assembly component and operable to compare the measurement data with the model data for the assembly environment, thereby assessing fit and alignment of the assembly component in relation to the assembly environment

9. A quality assessment system of Claim 9 wherein the assessment application is further operable to align the measurement data with the model data representative of the assembly environment prior to comparing the measurement data with the model data.